SERVICE MANUAL

Moyno®
2000 CC Pumps

MOYNO

Always the Right Solution™

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SERVICE MANUAL

Moyno® 2000 CC Pumps

1-1. INTRODUCTION

1-2. General

The Moyno 2000 pump is a progressing cavity pump. A single helical rotor rolling eccentrically in the double-threaded helix of the stator creates the pumping action. In its revolution, the rotor forms, in conjunction with the stator, a series of sealed cavities 180 degrees apart. As the rotor turns, the cavities progress from the suction to the discharge. As one cavity diminishes, the opposing cavity increases at exactly the same rate. Thus, the sum of the two discharges is a constant volume. The result is a pulsationless, positive displacement flow.

1-3. Scope

This service manual covers the installation and maintenance requirements for standard, close-coupled configuration of the Moyno 2000 pump line. Disassembly and assembly procedures are also covered in this manual.

1-4. Nameplate Data

The pump nameplate, located on the drive adapter, contains important information relative to the operation and servicing of the pump. This information includes the direction of rotation arrow and the pump model and serial numbers.

The model and serial numbers must be used when ordering spare parts.

1-5. Pump Rotation

A rotation arrow on the nameplate indicates the direction of rotation. Standard rotation of Moyno 2000 pumps is clockwise, when viewed from the driven end of the pump.

1-6. Model Number

The pump model number is a series of numbers and letters, which identifies the pump's basic design and materials of construction. A typical model number, for example, might be 1BB065CDQ3SA1AAAC, as shown on the nameplate in Figure 1-1.

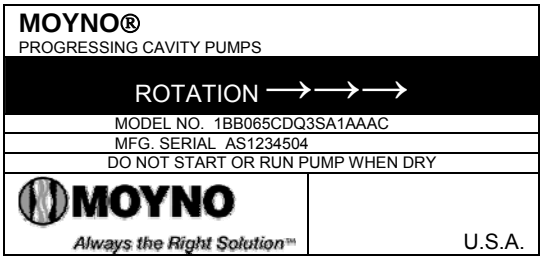


Figure 1-1. Typical nameplate showing rotation arrow, model, and manufacturing serial numbers.

The first six numbers and letters identify the pump's basic design characteristics.

In the first space, a number identifies the number of stages in the pumping elements. This will generally be a 1 or 2.

The second position, the letter "B", designates the pump type as being close-coupled.

In the third position, a letter designates the pump's drive train (con rod/gear joint/drive shaft):

A – One size smaller than element (175/220 only)
B – Same size as element
C – Same size as element, but larger gearbox drive flange and drive shaft size (175/220/345 only)

The next three positions, always numbers, identify the pumping element in terms of theoretical gallons per 100 revolutions.

The next 3 positions, always letters, describe the pump's "materials of construction" in component groups of parts.

The first letter in this group identifies the material of the suction housing casting.

The second letter indicates the material used in the rotating parts, i.e., the drive shaft, con rod, rotor, and other metallic parts in contact with the material being pumped.

The third letter indicates the material of the stator. It identifies only the stator material and not that of the tube in which the stator is placed. The tube, a non-wetted part, is always alloy steel.

The standard designation such as the CDQ used in our example would result in the following:

C = Cast iron suction chamber
D = Hardened alloy steel internals including drive shaft, con rod, gear joint, and rotor
Q = Nitrile (NBR) stator (70 durometer hardness)

The next position is a number identifying the current pump revision. This manual corresponds to Revision 3.

The next three letters indicate the sealing system of the pump. The first letter identifies whether packing, a single seal, or a double seal is being used. The second and third positions indicate specific seal or packing model and type used.

A typical trim code is SA1, designating the following:

S = Single mechanical seal
A1 = John Crane type 2100 SiC/SiC/Viton/316

The next letter indicates rotor variations. The most common designation is an A for standard size, chrome plated. Other options are available including special coatings, undersizes, and oversizes.

The next letter indicates whether there are any special options being used in the pump, typically this is an A for no special options.

The next letter indicates the suction configuration. For this pump an A is used designating a standard flanged pump.

The last letter indicates the drive configuration and flange/shaft/seal size. In our close coupled pump nameplate the C designates a 250mm flange and 45mm shaft.

2-1. INSTALLATION

2-2. General

Accessibility to the pump and adequate clearance should be prime considerations in any installation. Enough space should surround the unit so that maintenance can be performed with ease.

2-3. Piping

1. Suction piping should be as short as possible. Normally, the suction line should be the same diameter as the pump suction; however, conditions such as high viscosity or required minimum flow velocities may dictate otherwise. Long-sweep 90-degree elbows or 45-degree elbows should be used instead of the standard elbow. Avoid using suction piping loops, which trap air.

2. Discharge piping diameter should generally be as large as the discharge port unless fluid conditions indicate otherwise.

3. An easily removable section of piping, at least twice as long as the stator, should be mated to the discharge port. This will allow the rotor and stator to be removed without having to remove the complete pump from the base.

2-4. Foundation

For maximum pump-driver unit life, each unit should be mounted on a strong steel baseplate. The baseplate should be mounted on a firm foundation. The motors should be supported on close-coupled configurations above 30 HP.

3-1. OPERATION

3-2. Initial Check

Before putting the pump into operation, the following items should be checked to ensure that each piece of equipment is installed correctly:

- Electrical connections.
- Gauges and other instruments.
- Pump rotation. Rotation is indicated on the pump nameplate.
- All valves should be open on both suction and discharge sides of pump.
- Seal flush systems if required should be operational. Double seals require flushing between faces.

CAUTION: This is a positive displacement pump. Do not operate it against a closed valve.

3-3. Start-Up

CAUTION: DRY OPERATION IS HARMFUL TO THE PUMP! Never allow the pump to operate without liquid, as dry operation will cause premature wear of the stator and possible damage. The liquid being pumped lubricates the stator.

1. Before operating the pump for the first time, fill it with liquid to lubricate the stator for the initial start-up.

   Note: If the pump is shut down temporarily, enough liquid will remain in the system to provide lubrication upon restarting. It is advisable to maintain the suction piping at a higher elevation than the centerline of the pump in order to contain some liquid in the pump at time of shutdown.

2. Once the pump has been filled with liquid, check for direction of pump rotation by momentarily starting and stopping the drive. See pump nameplate for correct rotation.

3. Start seal flush water if so equipped.

4. Start pump.

3-4. Packing Leakage

The packed stuffing box is designed to control leakage, not stop it completely. Leakage is necessary to reduce friction and dissipate heat.

In a new pump, before the packing has had a chance to seat properly, excessive leakage through the stuffing box is common. Frequent adjustments of the packing gland may be necessary during the first few hours of operation in order to compress and seat the packing. See Section 4-3.

4-1. MAINTENANCE

4-2. General

The Moyno 2000 CC pump has been designed for a minimum of maintenance, the extent of which is routine adjustment of the packing. The pump is one of the easiest to maintain because the main elements are very accessible and require few tools to disassemble.

4-3. Packing Adjustment

Packing gland nuts (see Figure 4-1) should be evenly adjusted. Overtightening the packing gland may result in premature packing failure and possible damage to the shaft and gland.

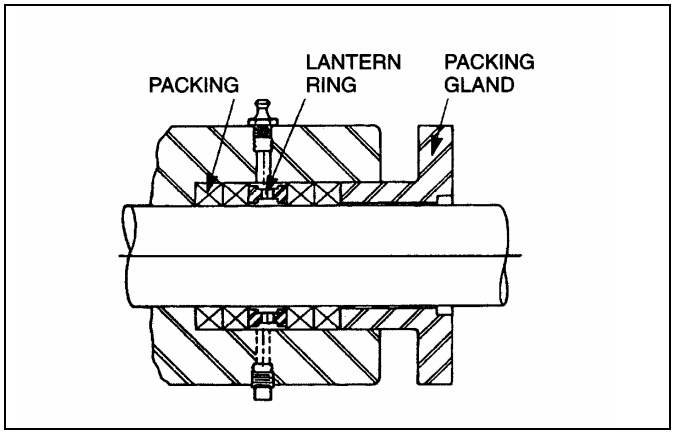


Figure 4-1. Cross Section of Packing Housing

When packing is new, frequent minor adjustments during the first few hours of operation are recommended in order to compress and seat the packing.

1. Upon initial start-up of the pump, adjust the gland nuts for a leakage rate of 50-100 drops per minute until the packing has seated and adjusted to the operating temperature (approximately 10-15 minutes).

2. If leakage is excessive after 15 minutes of operation, tighten the gland nuts ¼ of a turn.

3. Tighten the gland nuts ¼ of a turn after an additional 15 minutes if necessary and repeat this procedure until a desired leakage of 1-2 drops per minute is obtained. Adding grease may also reduce leakage by providing a barrier at the lantern ring.

CAUTION: Do not tighten until zero leakage is obtained. Overtightening the packing gland may result in accelerated wear on the packing and damage to the shaft. In those situations where no packing leakage can be tolerated, consult your Moyno Authorized Representative.

Area To Lubricate	Approved Lubricant or Equivalent
Packing	ACG-2 (Dubois Chemical, Inc.)

4-4. Packing Replacement

Note: In this section, the first reference to each pump part will be followed by a number or a letter in parentheses ( ). These numbers and letters are used to identify the pump parts and hardware items in the Exploded Views in Section 13-1.

When tightening the gland nuts can no longer regulate leakage, remove and replace the packing. The entire pump does not need to be disassembled to replace the packing. Briefly, replace as follows:

1. Remove packing gland nuts and slide gland halves (152) back along drive shaft (400).

2. Use a packing puller tool (see Figure 4-2) to remove the packing (150).

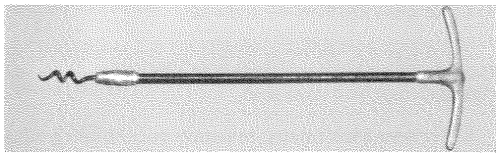


Figure 4-2. Packing Removal Tool

3. Inspect surface of drive shaft for excessive wear or grooves due to packing rub. If shaft is worn, or is badly scored or grooved, it should be replaced.

4. If drive shaft is not worn, install a lantern ring and four packing rings, lubricating them before installation with a good grade of packing grease. Be sure to stagger the packing ring joints at 90-degree increments.

Note: The stuffing box is supplied with four rings installed, a fifth ring may be added after initial compression.

CAUTION: ALWAYS USE A PROPER PACKING TAMPER TOOL TO INSTALL PACKING. Do not use a pointed or sharp tool, as damage to the packing material or drive shaft could result. To assure proper shaft lubrication, never use a one-piece spiral wrap packing.

5. Replace packing gland halves and secure with packing gland and nuts (156).

6. Adjust packing per Section 4-3.

5-1. DISASSEMBLY

Note: In this section and in following sections on CLEANING, INSPECTION, and ASSEMBLY, the first reference to each pump part will be followed by a number or letter in parentheses ( ). These numbers and letters are those used to identify the pump parts and hardware items in the Exploded Views in Section 13-1.

5-2. Disconnect Pump

1. Disconnect the power source.

2. Close suction and discharge valves to isolate the pump from the line.

5-3. Stator Removal

1. Remove section of discharge pipe attached to discharge flange (200).

2. Remove discharge flange by unbolting from stator clamp ring (210) and remove stator gasket (510). Use a screwdriver tip to remove stator retaining ring (480), stator clamp ring (210), and pump support (220) from stator (500).

3. Unbolt stator clamp ring (210) from suction housing and remove stator from rotor (turning stator clockwise while removing will ease disassembly). Remove the stator retaining ring. Remove stator clamp ring from stator. See Figure 5-1. for the typical retaining ring removal procedure.

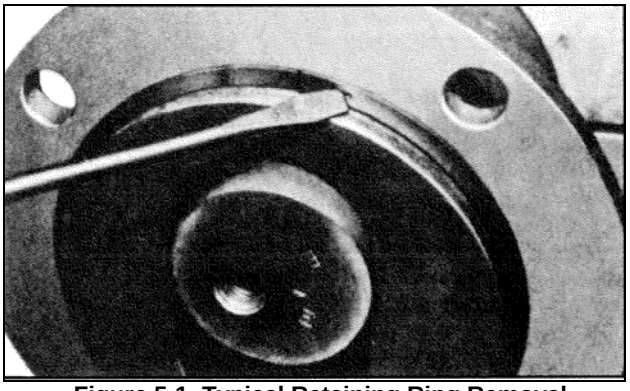


Figure 5-1. Typical Retaining Ring Removal

5-4. Suction Housing Removal

1. Remove four bolts and lock washers (230) holding the suction housing (100) to the drive adapter (10).

2. Pull the suction housing toward the rotor and away from the adapter housing. Place a block of wood under the suction housing to prevent it from dropping as you pull it away from the adapter housing.

5-5. Rotor / Con Rod / Drive Shaft Assembly Removal

1. Slide the slinger ring (60) along the drive shaft (400), towards the gear reducer, exposing the drive pin (70).

2. With a punch and hammer, tap the drive pin from the drive shaft.

3. Carefully pull the rotor / con rod / drive shaft assembly from the gear reducer. Place the assembly aside for now. On larger sizes where it may be awkward to remove the whole rotating unit as one piece, the rotor can be remove first. Refer to section 5-8 for joint disassembly instructions.

5-6. Packing Housing Removal

1. Pull the packing housing (140) away from the drive adapter (10). Remove the O-ring (530).

2. Remove the gland nuts (156), studs (155), and packing gland halves (152).

3. Use a packing removal tool to remove two rings of packing (150), two lantern rings (151), and the last two rings of packing (150).

OR

5-7. Seal Housing Removal

1. Pull the seal housing (140) from the drive adapter (10). Remove the O-ring (530).

2. Carefully push the stationary seal face from the adapter housing.

3. Carefully pull the rotating portion of the mechanical seal (150) from the drive shaft.

5-8. Rotor, Driveshaft, and Connecting Rod Disassembly

1. Remove the vent plug (440) and set screw (450) from the gear joint shell (410).

2. Remove six socket head screws (430) from head ring (420) and remove head ring and O-ring (540). Slide connecting rod/gear joint assembly off rotor head. Remove gear joint keys (360) and primary thrust plate (310) from rotor (470).

3. Slide gear joint shell (410) off gear ball/connecting rod assembly. Slide ring gear (350) off gear ball (300).

4. Clamp connecting rod (460) in vice and hold with pipe wrench and remove lock nut (330). Remove gear ball (300), secondary thrust plate (320), seal support (340), and gear joint seal (520) from connecting rod.

6. Repeat steps 2 through 5 for driveshaft joint disassembly.

NOTE: It is recommended that each time the rotor and gear joint is disassembled, the rotor head O-ring (360) and gear joint seal (520) should be replaced.

5-9. Drive Adapter / Gearmotor Removal

Remove the four bolts and lock washers holding the drive adapter (10) to the gear reducer. Pull the drive adapter from the reducer.

5-10. Cleaning

Clean parts in a suitable cleaning solvent.

6-1. INSPECTION

6-2. Driveshaft and Packing/Seals

1. Inspect drive shaft (400) for scoring, burrs, cracks, etc. Replace as necessary.

2. It is sound practice to always replace O-rings and gear joint seals.

3. It is sound practice to replace mechanical seals when the pump is disassembled. Extreme care should be taken to protect the seal faces from damage. These are fragile; avoid touching the faces and keep them clean. The rubber bellows will adhere to the shaft after assembly and must be replaced if removed from the shaft.

4. It is sound practice to always replace packing (150) whenever the pump is disassembled.

6-3. Rotor

1. To check for excessive rotor (470) wear, measure the rotor crest-to-crest diameter (see Figure 6-1.) and compare with the following chart:

Rotor Size	Standard Crest-to-Crest Diameter (Inches)
022	3.425
036	4.015
050	4.015
065	4.906
090	4.906
115	5.709
175	6.584
220	7.116
345	7.260

The rotor size is designated by the fourth, fifth, and sixth numbers in the model number (i.e.,1BB065).

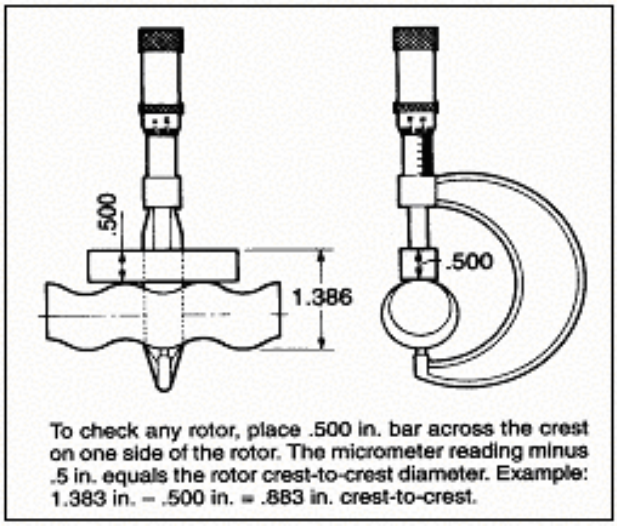

.500
1.386
.500
To check any rotor, place .500 in. bar across the crest on one side of the rotor. The micrometer reading minus .5 in. equals the rotor crest-to-crest diameter. Example: 1.383 in. – .500 in. = .883 in. crest-to-crest.

Figure 6-1. Measuring Rotor Diameter

2. If the measured crest-to-crest diameter is within .010 in. of the standard value, the rotor is reusable provided that:

a. The rotor surface is not cracked, pitted or deeply grooved (.030 in. or more).

3. Rotors with crest-to-crest diameters greater than .010 in. under the standard value should generally be replaced.

6-4. Stator

The best indication of stator wear (500) and the need for replacement is a drop in pump performance. Stators with interior surfaces that are pitted, grooved or gouged should also be replaced.

6-5. All Other Parts

Check for cracks, excessive wear, damage to threaded holes, burrs, etc. Replace as necessary. Replace O-rings (530) and both gaskets (510) at each disassembly and reassembly.

7-1. ASSEMBLY

7-2. Lubrication During Assembly

1. **Gear Joints.** Both gear joints should be packed with lubricant during assembly (Section 7-3). DO NOT use zerk fittings to lubricate gear joints after assembly. The pipe plugs (440) in the drive shaft head, drive shaft, and gear joint shell are vent plugs and MUST BE REMOVED during assembly of the gear joints to allow excess lubricant to vent from the gear joints.

2. **Packing.** Lubricate packing rings during assembly. Additional grease can be added after assembly through zerk fittings if installed in the side of the stuffing box.

3. **Approved Lubricants:**

CAUTION: Do not mix different brands of lubricants for the same application.

Area to Lubricate	Approved Lubricant or Equivalent
Gear Joints & Packing	ACG-2 (Dubois Chemical, Inc.)

7-3. Driveshaft and Rotor Gear Joint Assembly

1. Insert the primary thrust plate (310) into driveshaft/rotor head, flat side first. Thrust plate and driveshaft/rotor head surfaces must be flush to assure proper assembly and operation of the pump (see Figure 7-1.).

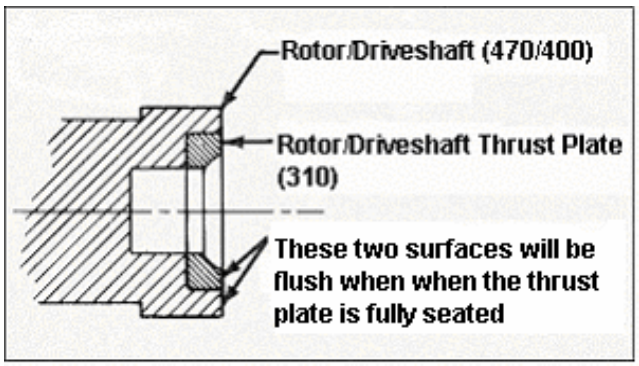

Rotor/Driveshaft (470/400)
Rotor/Driveshaft Thrust Plate (310)
These two surfaces will be flush when when the thrust plate is fully seated

Figure 7-1. Rotor Thrust Plate Seating Detail

2. Assemble the gear joint by first fitting a gear joint seal (520) onto the connecting rod assembly (460). The seal must be positioned so that the flat face of the seal neck fits into the seal retainer component of the connecting rod assembly. Apply a small coating of approved gear joint lubricant to the inside surfaces of the seal.

3. Apply a small amount of lubricant to the flat face of the seal support (340) and slide it onto the connecting rod so that the flat face and radius of the support is against the seal (520).

4. Grease the concave spherical surface of the rear thrust plate (320) and position thrust plate against the seal (520) with the lip on the outside diameter of the seal fitting the step on the back side of the thrust plate.

5. Apply a film of grease to the splines on the inside of the gear ball (300). Install gear ball on connecting rod (460), with counter-bored end (end without splines) first on connecting rod. Gear ball should slide freely against shoulder on connecting rod. Place lock nut (330) on connecting rod and tighten against gear ball. Apply grease to spherical surfaces and teeth of gear ball.

6. Apply grease to the teeth of the ring gear (350), and slide ring gear into the gear ball. When ring gear is in place, keyways should be facing the lock nut end of connecting rod.

7. Apply a thin coating of grease to the spherical surface of the thrust plate (310) already installed in the driveshaft/rotor head. Fill the recessed area in the driveshaft/rotor head with grease. Place keys (360) in the keyways in the ring gear.

8. Align the keys in the ring gear with the keyways in the driveshaft/rotor head and slide assembled gear joint components into the gear joint shell (410). Check to be sure the keys are properly engaged in the driveshaft/rotor head and ring gear.

9. Lightly lubricate the O-ring (540) and then position the O-ring in outside diameter O-ring groove slot of the gear joint head ring (420).

10. Slide the head ring (420) over the connecting rod (460), O-ring side first, towards the assembled gear joint components and driveshaft/rotor gear joint shell (410). Align holes in head ring (420) with six threaded holes in end of gear joint shell and install six stainless socket head screws (430). Tighten the six socket head screws evenly, checking to ensure O-ring (540) remains in place. When tightened properly, a small gap of a few thousandths of an inch may exist between the shell (410) and gear joint head ring (420). **Note:** After assembling the first joint the gear joint shell (410) for the second joint must be placed on the con rod before assembly on the second joint begins.

11. Excess grease in the assembly will be purged from the vent hole in the gear joint retainer (420) while the socket head screws are tightened. Rotate the free end of the connecting rod in a circular motion to assure that the joint is free and assembled properly. This will also help to purge excess grease from the assembly.

12. Install the stainless steel pipe plug (440) in the vent hole in the shell and tighten.

13. Coat the rotor (470) contour with waterless hand cleaner, glycol, or other lubricant compatible with the stator elastomer. Insert rotor into stator. **NOTE**: To ease assembly, turn the stator counter-clockwise while assembling onto the rotor.

15. For Pump Models **065 / 090 / 115 / 175 / 220 / 345**

    a. Secure the pump support (220) to the suction housing (100) with two hex head screws, lock washers, and nuts (230/260).

16. Slide stator clamp rings (210) on both ends of the stator (500) and secure in position with retaining rings (480).

7-4. Drive Adapter Assembly

Place the drive adapter (10) against the flange of the gear reducer and secure with four hex head screws and washers. Tighten evenly. Apply a liberal amount of anti-seize lubricant to the entire surface of the reducer shaft**. Note**: The drive adapter (10) must be mounted to the baseplate before the gearbox can be mounted. For units with a double or cartridge seal please refer to section 7-7 before mounting the gearbox to the drive adapter.

7-5. Pumps with Single Mechanical Seal

1. Carefully slide the rotating portion of the mechanical seal (150) onto the drive shaft up against the set collar (160). The seal face should be facing out, away from the connecting rod (460). Apply a small amount of grease to the ID of the rubber bellows making it easier to slide onto the shaft.

2. Gently push the stationary portion of the mechanical seal into the recess in the seal housing (140). Place the O-ring (530) on the shoulder of the seal housing.

3. Slide the seal housing into the drive adaptor (10). Secure the suction housing (100) to the drive adapter (10) with four hex head screws and lock washers (20/30). Take care to be sure the o-ring (530) is placed on the seal housing (140) before assembling.

4. Next, carefully slide the rotating/stator assembly first through the suction housing (100) and then through the seal stationary face in the seal housing and over the gear reducer shaft. Align the holes by rotating the motor fan. Use a punch to align the holes axially being careful not to damage the mechanical seal.

5. Replace the drive pin (70) and slide the slinger ring (60) onto the shaft over the drive pin (70)

OR

7-6. Pumps with Compression Packing

1. The standard packing set (150) consists of four braided packing rings. The lantern ring (151) must be ordered separately.

2. Wipe a film of lubricant on each packing ring and install two rings in the packing housing (140). Push each ring firmly in place, staggering the splits in each ring 90 degrees.

3. Install the lantern ring and the last two rings of packing, staggering the splits as before.

4. Install packing gland studs (155), packing gland halves (152), and gland nuts (156). Tighten nuts finger tight at this point. Place the O-ring (530) on the shoulder of the packing housing.

5. Slide the packing housing into the drive adaptor (10). Secure the suction housing (100) to the drive adapter (10) with four hex head screws and lock washers (20/30). Take care to be sure the o-ring (530) is placed on the seal housing (140) before assembling.

6. Next, carefully slide the rotating/stator assembly first through the suction housing (100) and then through the seal stationary face in the seal housing and over the gear reducer shaft. Align the holes by rotating the motor fan. Use a punch to align the holes axially.

7. Replace the drive pin (70) and slide the slinger ring (60) onto the shaft over the drive pin (70).

OR

7.7. Pumps with Double or Cartridge Mechanical Seals

1. Apply a small amount of grease to the ID of the rubber bellows or o-rings making it easier to slide onto the shaft.

2. Gently push the stationary portion of the mechanical seal into the recess in the seal housing and housing plate (140)(Cartridge seals are self contained.) Insert rotating seal assemblies in to the seal housing and bolt cover plate to the housing with four cap head screws. Place the O-ring (530) on the shoulder of the seal housing.

3. Hold the seal housing (150) in the drive adaptor (10). Secure the gearmotor to the drive adapter with four bolts. Gently rest the seal on the gearbox shaft. Secure the suction housing (100) to the drive adapter (10) with four hex head screws and lock washers (20/30). Take care to be sure the o-ring (530) is placed on the seal housing (140) before assembling.

4. Next, carefully slide the rotating/stator assembly first through the suction housing (100) and then through the seal stationary face in the seal housing and over the gear reducer shaft. Align the holes by rotating the motor fan. Use a punch to align the holes axially being careful not to damage the mechanical seal.

5. Replace the drive pin (70) and slide the slinger ring (60) onto the shaft over the drive pin (70)

7-8. Suction Housing/Stator Assembly

1. Bolt stator clamp ring (210) to the suction housing (100) with six hex head screws and lock washers (230/260).

2. Bolt stator clamp ring (210) to the discharge flange (200) with six hex head screws and lock washers (230/260).

7-9. Pump Connections

1. Connect suction and discharge piping to the pump. Check INSTALLATION instructions in Sections 2-1. through 2-6.

2. Review OPERATION instructions in Sections 3-1. through 3-4. before starting the pump.

8-1. STORAGE

Short-Term Storage. Storage of six months or less will not damage the pump. However, to ensure the best possible protection, the following is advised:

1. Store pump inside whenever possible or cover with some type of protective covering. Do not allow moisture to collect around pump.

2. Remove drain plug to allow the pump body to drain and dry completely.

3. See drive manufacturer's instructions for motor and/or drive storage.

4. See OPERATION, Sections 3-1. through 3-4., before startup. Be sure all lubricants are in good condition.

Long-Term Storage. If pump is to be in storage for more than six months, perform the above short-term storage procedures with the exception of Step 4. In its place it is suggested that the stator be removed to avoid developing a "set" condition. In addition: Apply rust inhibitor to all unpainted cast iron and machined carbon steel surfaces.

9-1. RECOMMENDED SPARE PARTS

Your Moyno 2000 pump has been designed and built to minimize overall operating cost. All wearable parts are replaceable. A recommended inventory of spare parts is dependent upon the application and the importance of continued operation.

To minimize downtime, we recommend the following spare parts be in your inventory: This is a suggested list. For further assistance, contact your Moyno representative.

(1) Rotor
(1) Stator
(2) Stator Gaskets
(1) Con Rod
(1) Mechanical Seal / Packing
(2) Gear Joint Kits *
(2) Gear Joint Seal Kits **

10-1. Hardware List – BB022 thru BA175

Ref No.	Description	BB022	BB036	BB050	BB065	BB090	BB115	BA175
20	Hex Screw-200mm	M10 X 50						
30	Lock Washer	M10						
40	Hex Nut	M10 X 1.5						
20	Hex Screw-250mm	M12 x 60						
30	Lock Washer	M12						
40	Hex Nut	M12 x 1.75						
20	Hex Screw-300mm				M12 x 65			
30	Lock Washer				M12			
40	Hex Nut				M12 x 1.75			
20	Hex Screw-350mm				M16 x 70			
30	Lock Washer				M16			
40	Hex Nut				M16 x 2.0			
20	Hex Screw-450mm							
30	Lock Washer							
40	Hex Nut							
50	Pipe Plug	3/4" NPT						
110	Hex Screw	M16 x 50			M20 x 55			
120	Lock Washer	M16			M20			
130	Pipe Plug	1" NPT						
153	Socket Pipe Plug	1/4-27 NPT						
154	Grease Fitting	1/4-27 NPT						
155	Gland Stud-Small Shaft	M8 x 1.25 x 50			M10 x 1.5 x 60			
155	Gland Stud-Large Shaft	M10 x 1.5 x 60						
156	Hex Nut-Small Shaft	M8 x 1.25			M10 x 1.5			
156	Hex Nut-Large Shaft	M10 x 1.5						
170	Socket Pipe Plug	1/4-18 NPT						
235	Hex Screw		M20 x 55		M12 x 50			
236	Lock Washer				M12			
237	Hex Nut				M12 x 1.75			
240	Hex Screw	M20 x 50	M20 x 45		M20 x 55			M20 x 60
245	Lock Washer	M20 x 50			M20			
250	Hex Screw	M16 x 40	M20 x 50		3/4-10 x 1.75"			
255	Hex Screw	M16 x 45			3/4-10 x 2.25"			
260	Lock Washer	M16			3/4"			
430	Socket Screw	#10-24 x .50"			1/4-20 x .625"			
440	Socket Pipe Plug	1/4-17 NPT						

10-2. Hardware List – BA220 thru BC345

Ref No.	Description	BA220	BB175	BB220	BB345	BC175	BC220	BC345
20	Hex Screw-200mm							
30	Lock Washer							
40	Hex Nut							
20	Hex Screw-250mm	M12 x 60						
30	Lock Washer	M12						
40	Hex Nut	M12 x 1.75						
20	Hex Screw-300mm	M12 x 65						
30	Lock Washer	M12						
40	Hex Nut	M12 x 1.75						
20	Hex Screw-350mm	M16 x 70						
30	Lock Washer	M16						
40	Hex Nut	M16 x 2.0						
20	Hex Screw-450mm					M16 x 55		
30	Lock Washer					M16		
40	Hex Nut					M16 x 2.0		
50	Pipe Plug	3/4" NPT						
110	Hex Screw	M20 x 55	M20 x 60					
120	Lock Washer	M20						
130	Pipe Plug	1" NPT						
153	Socket Pipe Plug	1/4-27 NPT						
154	Grease Fitting	1/4-27 NPT						
155	Gland Stud-Small Shaft	M10 x 1.5 x 60	M12 x 1.75 x 70					
155	Gland Stud-Large Shaft	M10 x 1.5 x 60	M12 x 1.75 x 70					
156	Hex Nut-Small Shaft	M10 x 1.5	M12 x 1.75					
156	Hex Nut-Large Shaft	M10 x 1.5	M12 x 1.75					
170	Socket Pipe Plug	1/4-18 NPT						
235	Hex Screw	M12 x 50						
236	Lock Washer	M12						
237	Hex Nut	M12 x 1.75						
240	Hex Screw	M20 x 60						
245	Lock Washer	M20						
250	Hex Screw	3/4-10 x 1.75"						
255	Hex Screw	3/4-10 x 2.25"						
260	Lock Washer	3/4"						
430	Socket Screw	1/4-20 x .625"						
440	Socket Pipe Plug	1/4-17 NPT						
450	Set Screw	5/16-18 x .625"						

11-1. Parts List – BB022 through BA175

Ref No.	Description	BB022	BB036	BB050	BB065	BB090	BB115	BA175
10	Drive Adapter -200mm	4251093003						
	Drive Adapter-250mm	4251093001			4251843003			
	Drive Adapter-300mm				4251843001			
	Drive Adapter-350mm				4251843002			
	Drive Adapter-450mm							
60	Slinger Ring	45 mm - 4230530000			60 mm - 4230531000			
		60 mm - 4230531000			80 mm - 4230532000			
70	Drive Pin	4220802017			4220796017			
100	Suction Housing-ANSI	4251750201	4251750001		4251751001			4251752001
100	Suction Housing-Metric	4251750301	4251750101		4251751101			4251752201
101	Inspection Plate	4240459101			4241290001			4241293001
102	Inspection plate gasket	Q = 4240460101 F = 4240460501			Q = 4241289001 F = 4241289005			4241294001
140	Packing Housing	45 mm - 4251671001			60 mm - 4251672001			
		60 mm - 4251084001			80 mm - 4251066001			
150	Packing Set	45 mm - 3403654003			60 mm - 3403654004			
		60 mm - 3403654004			80 mm - 3403654005			
151	Lantern Ring	45 mm - 4230482003			60 mm - 4230482004			
		60 mm - 4230482004			80 mm - 4230482005			
152	Packing Gland Half	45 mm - 4240927007			60 mm - 4240928007			
		60 mm - 4240928007			80 mm - 4240929007			
140	Seal Housing	45 mm - 4252056007			60 mm - 4252058007			
		60 mm - 4252057007			80 mm - 4252059007			
150	Mechanical Seal - John Crane 2100	45 mm - 4241749045			60 mm - 4241749060			
		60 mm - 4241749060			80 mm - 4241749080			
150	Mechanical Seal- Burgmann MG12	45 mm - 4241750045			60 mm - 4241750060			
		60 mm - 4241750060			80 mm - 4241750080			
160	Shaft Collar-Small Shaft	45 mm - 4230989015			60 mm - 4230990015			
		60 mm - 4230990015			80 mm - 4230991015			
200	Discharge Flange-ANSI	4240428001	4073000901		4083000901			4103001501
200	Discharge Flange-Metric	4241044001	4241046001		4230170001			4241311001
210	Clamp Ring	AG0933	AG0932		4083001000			4103001400
220	Pump Support	4063001100	4241301001-1		4241291001			4241295001
220	Pump Support-2 stage	4063001100	4241301001-2					
230	Pump Support	4241718001	6191760501-4		4241292001			4241302001
230	Pump Support-2 stage		6191760501-2		4241291001			
221	Stator Support 4 stage only		BF0382		BG0382			
300	Gear Ball *	AE0951			AF0951		AG0951	
310	Thrust Plate *	PE0981			PF0981		PG0981	
320	Thrust Plate *	PE0982			PF0982		PG0982	
330	Lock Nut *	RE0581			RF0581		RG0581	
340	Seal Support *	PE0891			PF0891		PG0891	
350	Ring Gear *	AE0952			AF0952		AG0952	
360	Key *	RE0761			RF0761		RG0761	
400	Drive Shaft-Plate	45 mm - 4252012015			60 mm - 4252014015		60 mm - 4252016018	
	Drive Shaft-Non Plate	45 mm - 4252012115			60 mm - 4252014115		60 mm - 4252016118	
	Drive Shaft-Plate	60 mm - 4252013015			80 mm - 4252015015		80 mm - 4252017018	
	Drive Shaft-Non Plate	60 mm - 4252013115			80 mm - 4252015115		80 mm - 4252017118	
410	Gear Joint Shell	PE0911			PF0911		PG0911	
420	Head Ring	PE034D			PF034D		PG034D	
460	Connecting Rod	4230983008			4230571008		4230099008	4230987008
470	Rotor - TS - 1 stage	C71EF1	C71EG1	C71E51	C71FH1	C71F91	C71GJ1	4251479007
470	Rotor - 316ss - 1 stage	C81EF1	C81EG1	C81E51	C81FH1	C81F91	C81GJ1	
470	Rotor - TS - 2 stage	C72EF1	C72EG1	C72E51	C72FH1	C72F91	C72GJ1	
470	Rotor - 316ss - 2 stage	C82EF1	C82EG1	C82E51	C82FH1	C82F91	C82GJ1	
480	Retaining Ring	AF0085	AG0085		AH0085			AK0084
500	Stator - 1 Stage	C310FQ	C310GQ	C3150Q	C310HQ	C3190Q	C310JQ	C310KQ
500	Stator - 2 stage	C320FQ	C320GQ	C3250Q	C320HQ	C3290Q	C320JQ	
510	Stator Gasket	BF085Q	BG085Q		BH085Q			BK085Q
520	Gear Joint Seal **	PE087Q			PF087Q		PG087Q	
530	O-ring**	TH211Q			J10111			
540	O-ring **	PE113Q			PF113Q			

Note: For Ref Nos. 500 - 540 the Q in the designation represents Nitrile (Buna N), The Q in part number is substituted with an B for EPDM or F for Flouroelastomer(Viton)

Items with an * or ** are available as a kit, please see below table for kit part numbers

*	Gear Joint Kit	KPE951	KPF951	KPG951
**	Gear Joint Seal Kit	KPE87Q	KPF87Q	KPG87Q

11-2. Parts List – BA220 thru BC345

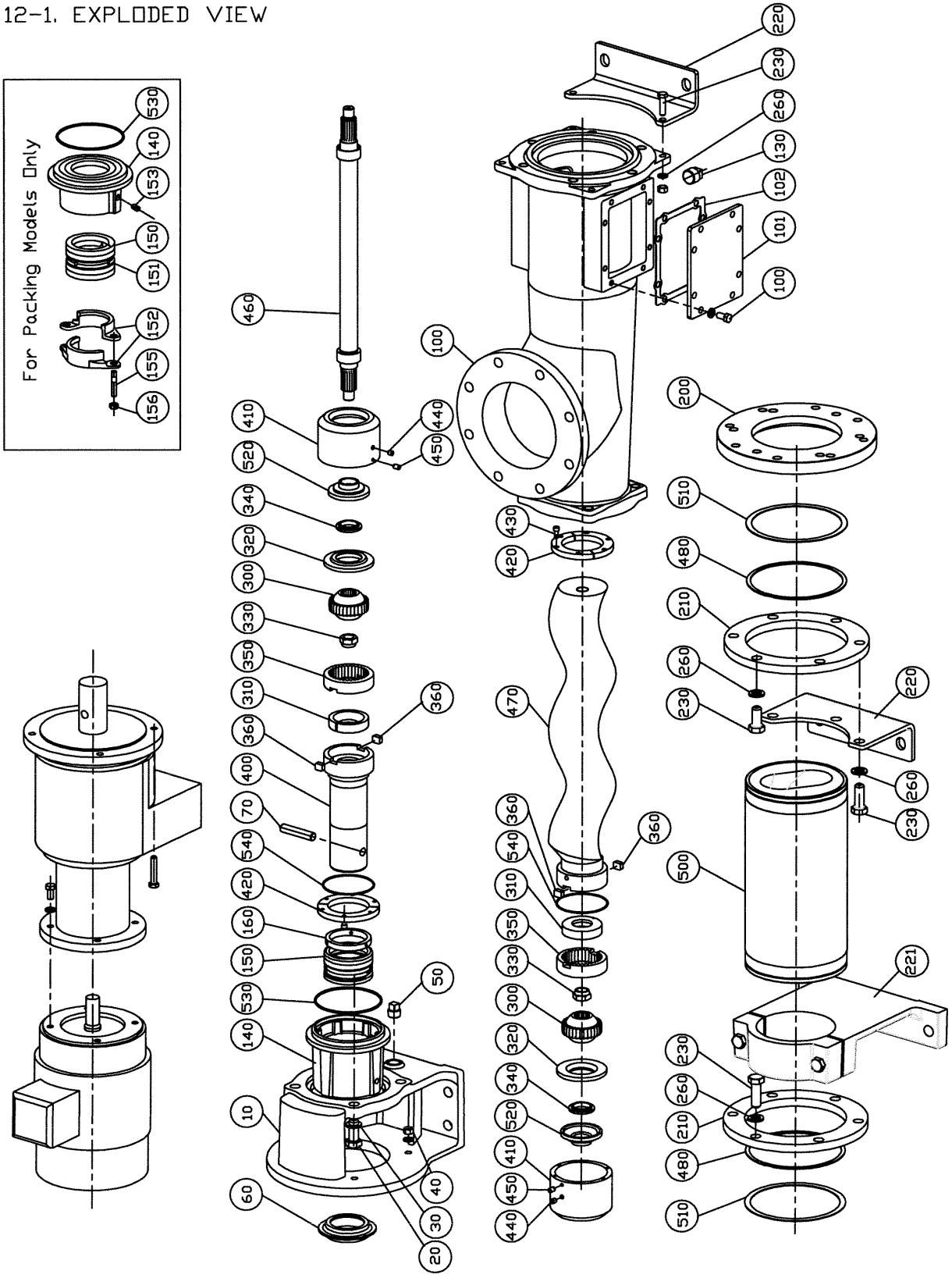
10	Drive Adapter-300mm	4251843001	4251039002					
	Drive Adapter-350mm	4251843002	4251039001					
	Drive Adapter-450mm		4052006002			4251069001		
60	Slinger Ring	60 mm 4230531000	80 mm 4230532000	100 mm 4230663000	120 mm 4230664000			
		80 mm 4230532000	100 mm 4230663000					
70	Drive Pin	4220796017	4220493017		4220642017			
100	Suction Housing-ANSI	4251752001	4251752101					
100	Suction Housing-Metric	4251752201	4251752301					
101	Inspection Plate	4241293001	4241293001					
102	Inspection plate gasket	4241294001	Q = 4241294001 F = 4241294005					
140	Packing Housing	60 mm 4251672001	80 mm 4252021001	4251086001	4251083001			
		80 mm 4251066001	100 mm 4251086001					
150	Packing Set	60 mm 3403654004	80 mm 3403654005	3403654006	3403654007			
		80 mm 3403654005	100 mm 3403654006					
151	Lantern Ring	60 mm 4230482004	80 mm 4230482005	4230482006	4230482007			
		80 mm 4230482005	100 mm 4230482006					
152	Packing Gland Half	60 mm 4240928007	80 mm 4240929007	4240931007	4240930007			
		80 mm 4240929007	100 mm 4240931007					
140	Seal Housing	60 mm 4252058007	80 mm 4252060007	4252061007	4252062007			
		80 mm 4252059007	100 mm 4252061007					
150	Mechanical Seal - John Crane 2100	60 mm 4241749060	80 mm 4241749080	100 mm 4241749100	120 mm 4241759120			
		80 mm 4241749080	100 mm 4241749100					
150	Mechanical Seal- Burgmann MG12	60 mm 4241750060	80 mm 4241750080	100 mm 4241750100	120 mm 4241759120			
		80 mm 4241750080	100 mm 4241750100					
160	Shaft Collar-Small Shaft	60 mm 4230990015	80 mm 4230991015	4230992015	6100470030			
		80 mm 4230991015	100 mm 4230992015					
200	Discharge Flange-ANSI	4103001501						
200	Discharge Flange-Metric	4241311001						
210	Clamp Ring	4103001400						
220	Pump Support	4241295001		4241295001	4241296001	4241296001		
220	Pump Support-2 stage							
230	Pump Support	4241302001		4241302001	4241303001	4241303001		
230	Pump Support-2 stage							
221	Stator Support - 4 stage							
300	Gear Ball *	AG0951	AH0951					
310	Thrust Plate *	PG0981	PH0981					
320	Thrust Plate *	PG0982	PH0982					
330	Lock Nut *	RG0581	RH0581					
340	Seal Support *	PG0891	PH0891					
350	Ring Gear *	AG0952	AH0952					
360	Key *	RG0761	RH0761					
400	Drive Shaft-Plate	60 mm 4252016018	4252018018	4252019018	4252020018			
	Drive Shaft-Non Plate	60 mm 4252016118	4252018118	4252019118	4252020118			
	Drive Shaft-Plate	80 mm 4252017018	4252019018					
	Drive Shaft-Non Plate	80 mm 4252017118	4252019118					
410	Gear Joint Shell	PG0911	PH0911					
420	Head Ring	PG034D	PH034D					
460	Connecting Rod	4230987008	4230985008					
470	Rotor - TS - 1 stage	4252006007	C71HK1	4252008007	4252024007	C71HK1	4252008007	4252024007
470	Rotor - 316ss - 1 stage		C81HK1			C81HK1		
470	Rotor - TS - 2 stage		C72HK1	4252010007		C72HK1	4252010007	
470	Rotor - 316ss - 2 stage		C82HK1			C82HK1		
480	Retaining Ring	AK0084						
500	Stator - 1 Stage	4241056101	C310KQ	4241056101	C3145Q	C310KQ	4241056101	C3145Q
500	Stator - 2 stage		C320KQ	4241056102		C320KQ	4241056102	
510	Stator Gasket	BK085Q						
520	Gear Joint Seal **	PG087Q	PH087Q					
530	O-ring **	J10111	3207902266					
540	O-ring **	PF113Q	3207902158					

Note: For Ref Nos. 500 - 540 the Q in the designation represents Nitrile (Buna N), The Q in part number is substituted with an B for EPDM or F for Flouroelastomer(Viton)

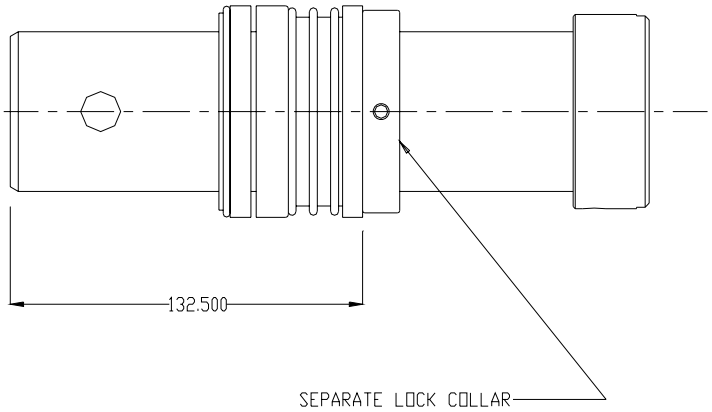
Items with an * or ** are available as a kit, please see below table for kit part numbers

*	Gear Joint Kit	KPG951	KPH951
**	Gear Joint Seal Kit	KPG87Q	KPH87Q

12-1. EXPLODED VIEW



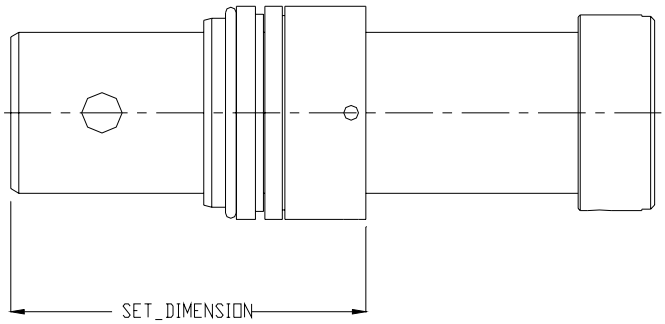
13-1. Seal Set Dimensions



TOLERANCES (UNLESS OTHERWISE SPECIFIED)			
ENGLISH (inch)		METRIC (mm)	
2 PLACE DEC.	± .03	1 PLACE DEC.	± .8
3 PLACE DEC.	± .010	2 PLACE DEC.	± .25
ANGLES	± 1/2°	ANGLES	± 1/2°
FINISH	125√	FINISH	N8√

DIMENSIONS IN mm - [ ] DENOTES INCH DIMENSIONS

PUMP MODEL	SHAFT SIZE	SET DIMENSION
		CRANE TYPE 2100 BURGMANN TYPE MG12
BB022, BB036, BB050	45.00	140.0 [5.51]
	60.00	132.5 [5.22]
BB065, BB090, BB115 BA175, BA220	60.00	144.5 [5.69]
	80.00	142.0 [5.59]
BB175, BB220, BB345	80.00	174.0 [6.85]
	100.00	169.0 [6.65]



PUMP MODEL	SHAFT SIZE	SET DIMENSION			
		CRANE TYPE 680 AES TYPE SAI	BURGMANN TYPE M7N	FLOWSERVE TYPE RD	CHESTERTON TYPE 491
BB022, BB036, BB050	45.00	140.0 [5.51]	140.0 [5.51]	151.0 [5.94]	139.0 [5.47]
	60.00	132.5 [5.22]	132.5 [5.22]	139.0 [5.47]	126.0 [4.96]
BB065, BB090, BB115 BA175, BA220	60.00	144.5 [5.69]	144.5 [5.69]	151.0 [5.94]	138.0 [5.43]
	80.00	142.0 [5.59]	142.0 [5.59]	145.0 [5.71]	142.0 [5.59]
BB175, BB220, BB345	80.00	174.0 [6.85]	174.0 [6.85]	177.0 [6.97]	174.0 [6.85]
	100.00	169.0 [6.65]	169.0 [6.65]	167.0 [6.57]	166.0 [6.54]
BC175, BC220, BC345	120.00	NA	214.0 [8.42]	NA	NA

14-1. TROUBLESHOOTING CHART

PUMP PROBLEMS PROBABLE CAUSE AND REMEDY	Pump does not rotate.	Pump does not discharge.	Discharge output low.	Discharge output fluctuates.	Pump drive overloaded.	Pump noisy.	Shaft seal leaks.	Stator wears too fast.	Rotor wears too fast.
Incorrect power supply; drive not properly wired. *Check motor nameplate data; test voltage, phase, & frequency.*					●		●		●
Foreign matter in pump. *Remove foreign matter.*				●	●		●		●
If pump or stator is new, too much static friction. *Fill with liquid, and hand turn.*					●				●
Stator swells due to chemical attack. *Change stator material.*		●			●				●
Stator swells due to high liquid temp. *Reduce liquid temp. or use an undersized rotor.*	●	●			●				●
Blockage due to solids in liquid. *Decrease solids-to-liquid ratio.*		●		●	●	●	●		●
Liquid settles and hardens after pump shut down. *Clean and rinse pump after each use.*	●	●	●	●	●	●	●		●
Suction pipe not submerged. *Reposition suction pipe.*				●		●	●	●	
Air in suction pipe. *Tighten connections to stop leaks.*				●		●	●	●	
Pump speed too low. *Increase drive speed.*							●	●	
Suction lift too high (cavitation). *Reduce suction losses; move pump to lower elevation; increase pipe size.*	●	●		●		●	●	●	
Pump running dry; no prime. *Fill pump with liquid; relocate suction piping.*		●		●	●		●	●	
Stator worn excessively. *Replace stator & inspect rotor.*				●		●	●	●	
Rotor worn excessively. *Replace rotor.*		●		●		●	●	●	
Wrong direction of rotation. *Reverse drive motor polarity.*			●					●	
Discharge pressure too high. *Open discharge valve; reduce discharge pipe length; remove obstruction, increase pipe size.*	●	●			●		●	●	
Suction pipe leaks. *Tighten pipe connections.*				●		●	●		
Shaft packing leaks. *Tighten packing gland; replace packing; lubricate packing.*						●	●		
Stator material brittle. *Replace stator.*	●	●		●			●		
Pump speed too high. *Reduce drive speed.*	●	●		●	●	●			
Liquid viscosity or specific gravity too high. *Measure and compare with specification.*				●	●	●	●	●	●
Packing too tight. *Loosen gland nuts, & lubricate packing.*					●				●
Bent drive shaft. *Replace drive shaft.*				●	●				
Drive and pump misaligned. *Re-align drive and pump.*				●					●
Flexible drive coupling worn. *Repair or replace coupling.*				●					
Drive shaft bearings worn. *Replace bearings.*			●	●					
Incorrect packing. *Change packing material.*			●						
Packing too loose. *Tighten gland nuts, & lubricate.*			●						
Incorrect parts. *If pump has been rebuilt, check to verify original Moyno parts used.*	●	●		●	●	●	●	●	●

NOTE: If further troubleshooting procedural information is needed, please contact your authorized Moyno Pump distributor.

Your Authorized Service Distributor is:

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